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Analysis of an inter-centre,web-based radiation oncology peer review case conference.

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Abstract:	Purpose: Peer review programs in radiation oncology are used to facilitate the process and evaluation of clinical decision-making. However, web-based peer review methods are still uncommon. This study analysed an inter-centre, web-based of peer review case conference as a method of facilitating decision making process in radiation oncology. Methodology: A benchmark form designed based on the ASTRO targets for radiation oncology peer review. This was used for the evaluating content of the peer review case presentations on forty cases selected from three participating radiation oncology centres. A scoring system was used for comparison of data and a survey was conducted to analyze the experiences of radiation oncology professionals who attended the web-based peer review meetings in order to identify priorities for improvement. Results: The mean scores for the evaluations were 82.7%, 84.5%, 86.3% and 87.3% for cervix, prostate, breast, and head and neck presentations, respectively. The survey shows that radiation oncology professionals were confident about the role of web-based peer reviews in facilitating sharing of good practice, stimulating professionalism and promoting professional growth. The participants were satisfied with the quality of audio and visual aspects of the web-based meeting. Conclusion: The results in this study suggest that simple inter-centre web-based peer review case conferences are a feasible technique for peer review in radiation oncology. Limitations such as data security and confidentiality can be overcome by use of appropriate structure and technology. To drive the issues of quality and safety a step further, small radiotherapy departments may need to consider web-based peer review case conference as part of their routine quality assurance practices.

Analysis of an inter-centre, web-based radiation oncology peer review case conference.

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ABSTRACT

Purpose: Peer review programs in radiation oncology are used to facilitate the process and evaluation of clinical decision-making. However, web-based peer review methods are still uncommon. This study analysed an inter-centre, web-based of peer review case conference as a method of facilitating decision making process in radiation oncology.

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Conclusion: The results in this study suggest that simple inter-centre web-based peer review case conferences are a feasible technique for peer review in radiation oncology. Limitations such as data security and confidentiality can be overcome by use of appropriate structure and technology. To drive the issues of quality and safety a step further, small radiotherapy departments may need to consider web-based peer review case conference as part of their routine quality assurance practices.

Keywords: *Peer review; Radiation Oncology; Quality and safety; Decision making;*

INTRODUCTION

There is compelling evidence supporting the implementation of peer review methods in radiation oncology. Research has shown that peer review is of critical importance and has the potential to improve both quality and safety in radiation oncology (1-3). Peer review programs at every stage in radiation oncology management can potentially eliminate some of the treatment inaccuracies that presumably result from poor management decisions, variations in treatment protocols, and lack of experience and robust quality assurance programs. In addition, peer review can identify trends and barriers associated with quality radiotherapy and share best practice or recommend changes accordingly.

In a recent document released by American Society for Radiation Oncology (ASTRO), peer review was identified as a critical component of a radiation oncology quality assurance (QA) program which can be used to ensure safety in all the processes involved (3). Peer review can also ensure that right decisions are made and there is consistency of practice (4). However, the concern in various radiotherapy departments is the development of a peer review method that is secure and effective in addressing the shortfalls in quality assurance programs(1). Smaller centres may have only one radiation oncologist, hence face-to -face peer review is not feasible. Web-based techniques can allow non-competing centres to collaborate and address safety and quality issues in radiation oncology.

Unlike face to face methods, web-based peer reviews may raise concerns such as effectiveness in addressing quality and safety issues data, security and confidentiality amongst other technical and logistical concerns. With such potential problems, the acceptance of web-based peer review in radiation oncology may require a transformational process. One example of web-based peer-review program includes the chartrounds.com (5), which has brought together radiation oncologists and physicists to connect and discuss cancer management issues. Yet with the ever-changing treatment protocols and regimens for different type of cancers, the need for physician-to-physician support is paramount. Evidence on the feasibility of such peer reviews is crucial in stimulating engagement into web-based peer reviews.

This study analysed an inter-centre, case-oriented, and web-based of peer review program against defined safety and quality targets. In addition, it analysed the experiences of radiation oncology professionals who attended the web-based peer review meetings in order to identify priorities for improvement.

BACKGROUND

The term peer review has been used in radiation oncology to encompass a multitude of activities including chart rounds, multidisciplinary meetings, physics audits and 'physician to physician' peer reviews. Peer review can be defined as; collaboration between two or more individuals for an extended period, with regular meetings and activities (at least once a month) in order to improve quality and safety (6). A variety of subjects, interventions and methods are used in a planned and structured way. The process may include setting criteria, data collection, and performance appraisal, exchange of experiences, developing guidelines, solving problems in practice, and making specific arrangements for achieving changes. Collaboration with respected peers and honest mutual provision and acceptance of evaluation and support are central to the process of peer review. Richard Grol (6) described peer review as 'a continuous, systematic and critical reflection by a number of care providers on their own and colleagues' performance using structured procedures with the aim of achieving continuous improvement of the quality of care.'

Marks *et al* (1) identifies several clinical situations where peer review is anticipated to be useful in radiation oncology. One practical example is when a patient presents with a recurrence for retreatment. The paucity of research regarding re-treatments necessitates collaboration with more experienced peers to come up with the best treatment approach. In addition, the delivery of radiotherapy continues to become sophisticated, promising increased accuracy for targeting of malignancies and avoidance of normal tissues with technologies such as stereotactic treatments and image guided radiotherapy (IGRT) (7). These evolutions of radiotherapy practices require stringent measures to ensure both quality and safety in healthcare provision. Though recognised standards of care such as the ASTRO have advocated for peer reviews in radiation oncology, there is a paucity of data regarding the development and evaluation of radiation oncology both 'traditional' and web-based peer reviews programs in light of the technological and intellectual developments.

To achieve high standards of quality and safety healthcare, ongoing practice evaluation of the processes that ensure that such standards are achieved may be necessary. Most organisations measure quality of clinical practice against identified performance benchmarks by peers, professional organizations or national regulatory bodies. Kleine (8) identifies benchmarking' as an excellent tool used to identify priorities for improvement, identify

partners who have accomplished certain goals and identify suitable radiotherapy practices. As a continuous improvement tool, benchmarking fits within the conceptual framework of Deming's wheel of quality (9).

Despite the availability of benchmarking tools, determining that appropriate standards are being met can be challenging and may depend on goals of the peer review program. In radiation oncology certain targets should be a priority in peer review presentations. For example, the inclusion of the prescribed dose and discussion of the dose volume constraints (DVCs) is crucial. To assist in the implementation of peer review programs, ASTRO provided a comprehensive list of potential targets and the need for prioritization (1). This list includes physician, physics and radiation therapists focused tasks. For example, physician focused tasks outlined include; the decision to treat; planning directive or goals (eg, dose-volume constraints, goals for normal tissues and target(s), prescribed doses and fractionation; clinical plan quality; eg, achieved doses-volumes; technical plan quality (completeness, complexity, as good as reasonably achievable, acceptable to meet the prescription intent) and a planned method for setup verification (eg, imaging). These targets can also be used to ensure that all important aspects are prioritized and discussed in the peer review meeting. However, the ability to visualize treatment images requires that technical aspects of the meeting be addressed carefully. In a web-based peer reviews, the suitability of audio and visual tools designed to assist users among other concerns such as data security may also evaluation (1). This may elevate safety and quality standards in web-based peer reviews and promote to radiation oncology professionals engagement.

In response to the need for radiation oncologists' collaboration, a web-based peer review program was developed between three Caribbean radiation oncology centres in October 2011. An online meeting is conducted on weekly basis to discuss all definitive-treatment cases prior to treatment. Radiation oncologists, physicists and dosimetrists attended the meetings to discuss patient management plans. Dose prescriptions and DVCs for the treatment plans are reviewed with the aid of a commercial meeting software-GoToMeeting' (Citrix systems, Inc; USA) (10).

MATERIALS AND METHODS

a. Analysis of the peer review meetings

The researcher participated in each meeting and evaluated the case presentations based on ten targets listed on the evaluation form (table 1). Four categories of patients (breast, prostate, cervix and head and neck) were evaluated. These categories represented commonly reviewed cases treated with curative intent. Each week, patients were selected at random from the three participating centres. A total of 40 patients were evaluated (10 from each category) between July and November 2013. The evaluation form was designed with reference to comprehensive physician focused ASTRO potential targets for radiation oncology peer review (1). To achieve comparability, a scoring system was used and the results were analysed.

b. Survey

A questionnaire was administered to all the regular attendees of the peer review meetings. This comprised four radiation oncologists, four medical physicists and two medical dosimetrists from 3 radiation oncology centres. The rationale for the survey was to analyse the experiences of the multidisciplinary team and also to identify priorities for improving the peer review program. An email outlining the purpose, time commitments and anticipated outcomes for enrolment in the survey was sent to all the participants of the weekly peer review meeting. Survey questions were both quantitative and qualitative in nature. The survey conducted had both closed and open-ended questions to allow the participants to comment on the peer review method.

RESULTS

a. Evaluation of the peer review meetings

The results from the evaluation of the peer review meetings were stratified according to the diagnosis categories. The meetings presented scored an average of 8.5 on a scale of 10 points. The head and neck cases achieved a mean score of 8.73 (SD _ 0.9), followed by the breast with a mean score of 8.63(SD_0.92). The reviews for prostate cancer patients scored a mean of 8.45(SD_1.02), whereas the reviews for cancer of the cervix patients scored lowest (M_8.27, SD_1.5).

In addition to evaluating the content of the presentations, the researcher examined whether the current peer review had some measures of security and confidentiality in place. One set-back on this aspect was the in availability to standards from the radiation oncology community to evaluate against. Since commercial software (10) was used for the meetings, it provided features which addressed security and confidential issues as shown in table 2. It is important to recognize that these were security measures claimed by the commercial software.

b. Survey results

Qualitative analysis of the study consisted of using content analysis procedures. The researcher analysed the open-ended responses and identified themes that could be used for improving the peer review program. Quantitative analysis of the study consisted of using the Likert scale technique (11) to score the participant's response to each statement. Each statement was individually scored and then all statements were summed to get representation of the participants' perceptions. This scoring was based on higher points for positive responses and lower points for negative responses. For example, the rating scale is strongly agree (4), agree (3), disagree (2), strongly disagree (1), and not applicable (0).

In section 1, one question addressed the perceptions of participants towards the role of peer review in promoting practice advancement. The response was very favorable (M _3.44, SD _ 0.53). The survey also demonstrated that approximately all participants had a positive perception towards the role of peer review in promoting safety and quality in radiation oncology. Three specific questions directly addressed the role of peer review in motivation for

facilitating self regulation of practice, research interest and increasing accountability. Tables 3-5 show the overall perception to these sub questions, respectively.

Table 2. Minimum Security and confidential provided by the commercial software.

Feature	Description
Security	
	• Use of a meeting password • Preventing unauthorized use of service and its features so that only legitimate users and invited participants can schedule and participate in the meeting. • The meeting sessions are only available to the organizer and invited participants. Users are authorized to view it. • Use of security controls based on cryptographic methods
Communications confidentiality and integrity.	
	• All sensitive communications takes place over SSL-protected connections to prevent disclose of sessions credentials • Connections are end-to –end encrypted so that they are only accessible to authorized by meeting participants

Abbreviation(s): Secure Sockets Layer (SSL); are cryptographic protocols designed to provide communication security over a computer network.

Table 3. Facilitates self-regulation of radiation Oncology practice

	Number of responses	*Mean score*	*Standard Deviation*
Strongly agree	3		
Agree	6		
Disagree	0		
Strongly disagree	0		
		3.3	0.5

Table 4. Motivates research interest

	Number of responses	*Mean score*	*Standard Deviation*
Strongly agree	1		
Agree	7		
Disagree	0		
Strongly disagree	1		
		2.89	0.78

Table 5. Increases accountability

	Number of responses	*Mean score*	*Standard deviation*
Strongly agree	0		
Agree	9		
Disagree	0		
Strongly disagree	0		
		3	0

Section 2 of the questionnaire focused on the feedback from the peers. The results were positive with regards to the feedback from colleagues during the peer review meetings. However, there were contrasting opinions on what could be done to improve the peer review meeting. For instance, one participant recommended the discussion the dosimetry and physics aspect of the presented treatment plans. Whilst another participant preferred the discussion to be limited to content that facilitated clinical decision making only. There were differences in opinion regarding time allocation for the peer-review meeting and the time of the day that peer review should be conducted. Some participants recommended the discussion of only 1 or 2 cases per session in depth; likewise another participant recommended only the discussion of non-standard treatment cases. However, 89% of the participants did not give an opinion on the number of cases which should be reviewed per session.

In section 3 the participants were asked to rate the quality of the audio, visual aspect of the web-based meeting and the results are shown in table 6.

Table 6. The quality of audio and visual aspects

	Number of responses	*Mean score*	*Standard deviation*
Strongly agree	4		
Agree	5		
Disagree	0		
Strongly disagree	0		
		3.4	0.53

The rationale was to get feedback on the quality of the isodose plans and Dose volume histograms (DVHs) presented in the meetings. The participants were satisfied with the web-based peer review, except for one recommendation to increase the size of the DVH to improve clarity. Another recommendation was that presenters should take time in presenting each case so that the audience can see the isodose distribution and DVH clearly and be able to give appropriate feedback.

DISCUSSION

The peer review meetings

During the development of a peer review program, radiation oncology professionals define a set of targets which should be covered in the peer review discussions. The results from the analysis of the peer review meetings were stratified according to the diagnosis categories and rated. In general it seemed that more complex cases were able to engage and stimulate longer discussions.

Technical requirements

Web-based peer review programs require suitable technology that facilitates discussion of treatment plans, dose volume histograms (DVHs) with clarity. Implementing peer review requires research and planning (12). The authors analyzed the technical and logistical concerns highlighted by the participants in this study. This study shows that the majority of participants were satisfied with clarity visual and audio during web-based presentations. Based on the experience from the web-based peer review meetings, sometimes internet and hardware failures can affect the flow of reviews. Therefore, there is need to ensure usage of good computers and networking systems. Literature highlights the need for improving technologies for radiation oncology peer reviews. Palta, Frouhar and Dempsey, *et al* (13) presented an infrastructure of comprehensive tools that could be used for web-based peer review through use of the resource centre for emerging technologies (RCET) system. This system allows submission, auto-archiving, web-based reviews through retrieval and evaluation of diagnostic images and treatment planning data. However, its implementation in small radiotherapy centres could be limited by lack of knowledge about its availability, lack of information technology (IT) skills and cost to purchase required software. Therefore, there still is a need for affordable, effective and secure models for web-based peer reviews.

Feedback and recording of outcomes.

B, Sophie F, and McGowan T, *et al*.(14) highlight the benefits of recording the outcomes as part of the treatment record. In addition, they addressed the patterns of recording peer review outcomes. It is important that in web-based peer review development users decide ‘what’, ‘how’ and ‘where’ to record the outcomes and feedback from the meetings. Though our survey results reflect a positive attitude towards the feedback from colleagues. In the current

study, the authors did not analyse how the participating centres recorded the outcomes and feedback from the reviews.

Literature some barriers to honest feedback which include; fear of retaliation that may tarnish the notion of peer review. Haag-heitman and Vicki George (15) highlight the lack of constructive feedback and giving inflated affirming feedback, ineffective '*pal*' review as a contributor to the negative connotation that professionals may have about peer review processes. La Lopa (16) refers to the "halo effect bias" arising from a reviewer who has positive feelings for their reviewee and thus provides more favourable feedback than their performance would merit. During the early stages of implementation of peer review, there is might be a fear of offending the other colleagues, but the trust and collegiality tends to improve with time.

Despite such negative connotations, Chamunyonga and Bridge (17) argue that peer review bring many benefits that transfer well to radiotherapy practice. Brooks and Olsen, *et al* (18) describe the development of a peer review process to enhance professional practice. Additional benefits include, "affirmation, and inspiration" gained by the peers which increases confidence about aspects of their practice (19). However, for peer review to be successful an open and honest partnership must be established between peers. Evidence suggests that pairing for mutual review nurtures the provision of practice sharing and support (20).Thus it is important that partnerships are formed from radiation oncology centres which are unlikely to be in competition with each other.

Security and confidentiality

The exposure of patient information over the internet requires strict guidance to ensure that the risk of security breach is avoided (21). The current analysis indicate some level of security and confidentiality through the use of login passwords, the desirable security features which include "end-to-end" security, over**S**SL-protected connections such as those claimed by commercially available software such as GotoMeeting (Citrix solutions Inc, USA) (11).

The use online service for peer review in radiation oncology requires that the users identify the safety features necessary to prevent any potential threats to confidentiality. There may be a need to decide on which features to use so that confidentiality issues are addressed. Though inter-centre peer review has been advocated by ASTRO (1), there is no data available on inter –country peer reviews in Radiation Oncology. As additional evidence on web-based peer

reviews increase professional bodies and accrediting organizations may need to develop minimum security and confidentially standards for web-based peer reviews.

Limitations

The limitation to the methodology was the small sample size due the small number of participants. Although the population size was small, their responses were useful as they allow the participating centers to review the peer review method based on their recommendations.

Recommendations

The following recommendations can be made based on the results of the study;

1. Small radiation oncology centers should consider collaborating with nearby centers to conduct peer review case conferences.

2. Appropriate technology is required to ensure secure platforms, and good clarity of the presenters and audience voice, and quality images to view anatomical detail.

3. To successful implement web-based peer reviews, there is need for structure and procedures for standardization and recording of feedback and outcomes.

CONCLUSIONS

Peer review is a method of improving professional growth and quality of care. It can identify trends, challenges and barriers to safe delivery of high quality radiotherapy and recommend appropriate changes. The results in this study suggest that simple inter-centre web-based peer review case conferences are feasible and offer an alternative technique for peer review in radiation oncology. A willingness to participate, coupled with the right tools for a structured peer review program can allow radiation oncologists to collaborate from different locations. Although limitations such as the need for data security and confidentiality exist, they can be overcome by use of appropriate technology provided by commercially available software.

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Ethics

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Conflict of interest

None

References

1. Marks LB, Adams RD, Pawlicki T, et al. Enhancing the role of case orientated peer review to improve quality and safety in radiation oncology. *Pract Radiat Oncol*. 2013; 3(3): 149-156.

2. Marks LB, Jackson M, Xie L, et al. The challenge of maximising safety in radiation oncology. Pract Radiat Oncol 2011; 1: 2-14.

3. Lawrence YR, Whiton MA, Symon Z, et al. Quality assurance peer review chart rounds in 2011: a survey of academic institutions in the United States. *Int J Radiat Oncol Biol Phys*. 2012; 84: 590–595.

4. Pawlicki T and Mundt AJ. Quality in Radiation Oncology. Med Phys. 2007; 34(5): 1529-1534.

5. Chartrounds.com.2014. Retrieved from https://www.chartrounds.com/Default.aspx

6. Grol R. Quality improvement by peer review in primary care: a practical guide. Qual Health Care 1994; 3: 147-152.

7. Bissonnette J P, Balter P A. and Dong L, et al. Quality assurance for image-guided radiation therapy utilizing CT-based technologies: A report of the AAPM TG-179. *Med. Phys.* 2012; 39 (4):1946-1963.

8. Kleine, B. Benchmarking for continuous performance improvement: tactics for success. *Total Quality Environmental Management.*1994; 283: 95.

9. Amina E T, Levif M, Michael P. Benchmarking: A method for continous Quality Improvement in Health. *Healthc Policy*. 2012; 7(4): 101–119.

10. Briggs L. Peer review for advanced practice nurses *AACN Clinical Issue.* 2005; 16(1):3-12.

11. Citrix Online Web Conferencing Tools: Security White Paper; 2010.Available at: http://l1.osdimg.com/online/dam/pdf/en/resources/wp/Citrix-Online-Web-Conferencing-Security.pdf

12. Likert R, "A Technique for the Measurement of Attitudes," *Archives of Psychology.* 1932; 140(55).

13. Palta J, Frouhar VA, Dempsy JF. Web-based submission, archive, and review of radiotherapy data for clinical quality assurance: A new paradigm. *Int J Radiat Oncol Biol Phys.* 2003; 57(5): 1427–1436.

14. Michael B, Sophie F, and McGowan T, et al. A survey of radiation treatment planning peer-review activities in provincial radiation oncology programmer: current practice and future direction. *BMJ Open.* 2013; 3:5-6.

15. George V, Haag-Heittman B. Nursing peer review: the managers' role. *J Nurs Manage.* 2011; 19(2): 254-259.

16. La Lopa JM. A Scholarly Approach to a Peer Review of Teaching. *J Culin Sci Tec*. 2012; 10 (4): 352-364.

17. Chamunyonga C, Bridge P. Radiation therapist peer review: raising the bar on quality and safety in radiation oncology. *Journal of Radiotherapy in Practice*. 2014.p 1-6

18. Brooks S, Olsen P, Rieger-Kligys S, Mooney L. Peer review: An approach to performance evaluation in a professional practice model. *Critical Care Nursing Quarterly*. 1995; 18(3): 36-47.

19. Gusic M, Hageman H, Zenni E. Peer review: a tool to enhance clinical teaching. *Clin Teach 2013*; 10: 287-290.

20. Hansen SD. Inviting observation. *Prin Leadership*. 2010; 11(2): 52–56.

21. Gritzalis D. A baseline security policy for distributed healthcare information systems. *Computers and security.*1997; 16(8):709–719.

Table 1. Peer review content analysis form.

Criteria	Included (y/n)	Score	Notes
Pertinent history and Presentation			
Diagnostic work –up	☐	☐	_____
Clinical Examination	☐	☐	_____
Decision to treat			
Stage of disease	☐	☐	_____
Goal (Curative, adjuvant, palliative)	☐	☐	_____
OAR dose assessed	☐	☐	_____
Integrate RT with other modalities?	☐	☐	_____
Prescribed Dose/fractionation	☐	☐	_____
Treatment planning Clinical plan quality ***(3D dose display, DVH, etc)***			
Isodose display	☐	☐	_____
DVH display	☐	☐	_____
Follow-up plan discussed	☐	☐	_____
Total Score (out of 10)		☐	